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GOLD AND PRICES, 1890-1907

I

The influence of the large production of gold upon the level of prices in the last decade presents one of the most interesting problems in theoretical as well as in practical economics. Since Ricardo, and even before him, the familiar theory has been held that an increase of the circulating medium necessarily produces an increase in the prices of goods. Yet, in the United States, we have had falling prices with an increasing circulation. Indeed, the old theory of Ricardo and Hume no longer holds undisputed sway.

There seems to be general agreement that the price of an article, like wheat, is the quantity of the given standard for which it will exchange. Obviously, price is an expression of the exchange-ratio between a commodity, like wheat, and a standard, like gold. Hence, in these later days, it has been seen that this ratio can be changed by forces affecting either term of the ratio. While the causes influencing the supply and demand of gold are supposed constant, we know that causes touching the demand and supply of wheat can modify its gold price. A scanty harvest and a reduced supply of wheat, or a new demand, will raise its price; while reduced freights, improved processes, an increase of supply, or a diminished demand, will lower its price. These facts, touching wheat alone, are self-evident; and they show that changes in price are not to be attributed solely to forces affecting

the gold factor of the price-ratio. Yet, it is also true that the price of wheat, or of all commodities, expressed in gold, would be affected by anything which was important enough to change the value of gold. Thus we see that the problem of price is one which includes a study of two sets of forces: (1) those influencing the standard, and (2) those influencing the commodities in the price-lists. A change in a list of prices, in itself, implies nothing as to the cause of the change. The originating cause may be operating upon gold, or upon the goods; or there may be causes working at once upon both sides, opposing or co-operating. It is, therefore, unsafe to dogmatize upon the causes of a change in prices without an investigation into all the facts touching both gold and goods.

We have, however, one general principle to assist us in such a search. The durability of gold causes all the past product to remain as the stock of today. That is, all the gold mined since 1492, and not lost or destroyed, forms the present supply; while the total supply of wheat today is practically only the annual supply. Consequently, a change in the demand or in the annual supply of gold affects very slightly the value of a large total supply; while a shortage in the annual supply of wheat produces a great change in the value of wheat. That is, the larger the accumulated stock of gold—now about \$11,000,000,000—the less likely is it to be influenced in short periods of time by any causes affecting gold alone. While, on the other hand, any commodity like wheat may undergo rapid or extreme changes in price, for causes which are in no way connected with gold and which affect only the commodity itself. Therefore, changes due to gold alone can only be very slow in their operation; while quick and frequent changes must be due to causes affecting only goods.

With these general observations, we may now proceed to discuss the movements of prices in the last decade, and try to analyze the causes at work which have produced the changes.

In the present article, it is proposed to give only the general results of an investigation which has been carried on for some years. It would be impossible to lay before the reader here all

the material upon which the conclusions have been based. Perhaps, in the future, it may be permitted to present a more detailed and extensive study upon this subject. The general results are presented now, not only from a desire to obtain the gains of criticism but also because the public seems to be interesting itself again in the subject of money, particularly in the relation of the new gold to prices.

II

First, we must ascertain the facts, (1) as to the yield of gold, and (2) as to the movement of prices. The production of gold since 1492 can be seen by the accompanying tables.

For the purposes of our present inquiry, it will be noted that the total production to the year 1895 was \$8,781,513,666; while the additions in the last decade have been \$2,896,-963,500. If we count the whole production, without consumption in the arts, and without loss or abrasion, to the year 1850, as the total supply in that year, and treat the total production since then to 1895, as added to the total available supply, then, the percentage of increase in gold in the last decade has been about 33. But, if we suppose that in 1850 the available stock could not have been more than \$2,000,000,000, after the losses and consumption from 1492 to 1850; and if we suppose that \$50,000,000 a year went into the arts in the 45 years from 1850 to 1895, leaving the net addition to the monetary stock about \$3,373,000,000 in 1850-95, the available supply in 1895 was about \$5,373,000,000. Then the percentage of increase in the last decade would be about 53. Now, if this were all there was in the price problem, we could infer at once that gold ought to have fallen in value, and that the general level of prices ought to have risen by from 33 to 53 per cent.

But supply is only one of the forces directly affecting the value of gold. The demand for gold may, or may not, have increased in as great a proportion as the supply. The new demand for gold may appear (1) in non-monetary uses, as in the arts, or (2) in an increased use of gold in the monetary systems of the world. In regard to the annual consumption of

GOLD PRODUCTION

TABLE I.—PRODUCTION BY PERIODS (1493–1875)

PERIOD	OUNCES		VALUE	
	Annual Average	Total	Annual Average	Total
1493–1520....	186,470	5,221,160	\$3,854,334	\$107,921,352
1521–1544....	230,194	5,524,656	4,758,109	114,194,616
1493–1544....		10,745,816		222,115,968
1545–1560....	273,596	4,377,544	5,655,229	90,483,664
1561–1580....	219,906	4,398,120	4,545,467	90,909,340
1581–1600....	237,267	4,745,340	4,904,308	98,086,160
1601–1620....	273,918	5,478,360	5,661,885	113,237,700
1545–1620....		18,999,364		392,716,864
1621–1640....	266,845	5,336,900	5,515,686	110,313,720
1641–1660....	281,955	5,639,110	5,827,906	116,558,120
1661–1680....	297,709	5,954,180	6,153,645	123,072,900
1681–1700....	346,094	6,921,895	7,153,762	143,075,240
1701–1720....	412,163	8,243,260	8,519,409	170,388,180
1721–1740....	613,422	12,268,440	12,079,432	253,588,640
1741–1760....	791,211	15,824,230	16,354,321	327,086,420
1761–1780....	665,666	13,313,315	13,759,316	275,186,320
1621–1780....		73,501,330		1,519,269,540
1781–1800....	571,948	11,438,970	11,822,165	236,443,300
1801–1810....	571,563	5,715,627	11,814,207	118,142,070
1781–1810....		17,154,597		354,585,370
1811–1820....	367,956	3,679,568	7,605,650	76,056,500
1821–1830....	457,044	4,570,444	9,447,100	94,471,000
1831–1840....	652,291	6,522,913	13,482,854	134,828,540
1841–1850....	1,700,501	17,605,018	36,389,555	363,895,550
1811–1850....		32,377,943		669,251,590
1493–1850....		152,779,050		3,157,939,332
1851–1855....	6,350,897	31,754,475	131,273,041	656,365,205
1856–1860....	6,625,589	33,127,945	136,950,915	684,754,575
1861–1865....	5,952,445	29,762,225	123,037,038	615,185,190
1866–1870....	6,170,153	30,850,765	127,537,062	637,685,310
1851–1870....		125,495,410		2,593,990,280
1871–1875....	5,487,884	27,439,420	113,434,562	567,172,810

TABLE 2.—PRODUCTION BY YEARS (1876-1906)

PERIOD	OUNCES		VALUE	
	Annual	Total	Annual	Total
1876.....	5,521,453		\$114,128,433	
1877.....	5,878,973		121,518,372	
1878.....	5,905,275		122,062,034	
1879.....	5,043,516		104,249,476	
1880.....	5,043,516		104,249,476	
1876-1880....		27,392,733		\$566,207,791
1881.....	5,166,440		106,790,315	
1882.....	4,945,832		102,230,347	
1883.....	4,777,570		98,762,372	
1884.....	5,007,921		103,513,727	
1885.....	5,015,123		103,662,592	
1881-1885....		24,912,866		514,959,353
1886.....	5,135,679		106,163,900	
1887.....	5,116,861		105,774,900	
1888.....	5,330,775		110,196,900	
1889.....	5,973,790		123,489,200	
1890.....	5,749,306		118,848,700	
1886-1890....		27,306,411		564,473,600
1891.....	6,320,194		130,650,000	
1892.....	7,094,226		146,651,500	
1893.....	7,618,811		157,494,800	
1894.....	8,764,362		181,567,600	
1895.....	9,615,337		200,406,600	
1891-1895....		39,412,930		816,770,500
1896.....	9,783,914		202,251,600	
1897.....	11,420,068		236,073,700	
1898.....	13,877,806		286,879,700	
1899.....	14,837,775		306,724,100	
1900.....	12,315,135		254,576,300	
1896-1900....		62,234,698		1,286,505,400
1901.....	12,625,527		260,992,900	
1902.....	14,354,680		296,737,600	
1903.....	15,852,680		327,702,700	
1904.....	16,804,372		347,377,200	
1905.....	18,268,696		377,647,700	
1901-1905....		77,905,955		1,610,458,100
1906.....	19,366,550		400,342,100	

SUMMARY OF GOLD PRODUCTION (1493-1905)

Period	Ounces	Value
1493-1850.....	152,779,050	\$3,157,939,332
1851-1875.....	152,934,830	3,161,163,090
1876-1895.....	119,024,940	2,462,411,244
1896-1905.....	271,959,770	5,623,574,334
1493-1905.....	564,779,473	11,668,471,166

gold in the arts there are no accurate statistics: the amount can only be guessed at. At the outside \$70,000,000 a year may have gone into non-monetary consumption; or \$700,000,000 in the last 10 years. This is probably too large.

As to the increase in the monetary systems of various countries, the estimates of the United States Mint have been quite generally accepted. These figures are published each year in the report of the Director of the Mint, and state the amount of gold, silver, and uncovered paper in the principal countries of the world, given in reports sent in by our representatives stationed in these countries. For 1896,¹ the total monetary stock of gold is given as \$4,143,700,000; while for 1906² it is \$6,888,900,000. Thus, according to these estimates, the currencies of the world have had a new demand in the last decade for \$2,745,200,000 of gold—or close to the figure of the new supply in the same period. About one-half of the new supply has gone into banks and public treasuries, and one-half into circulation. It is much to be doubted whether it is safe to assume that the Mint estimates are wholly correct. The judgment of many of our foreign representatives, not trained in such subjects, must be taken with many grains of salt. For instance, official information for gold in circulation outside of banks is given for only Argentina, Chile, Peru, and Venezuela in South America. Also, the stated amount in circulation in France and Germany is only the estimate of the United States Mint. Hence we cannot place too much reliance on these figures. So far as they go, they show that all the new gold was directly demanded for monetary pur-

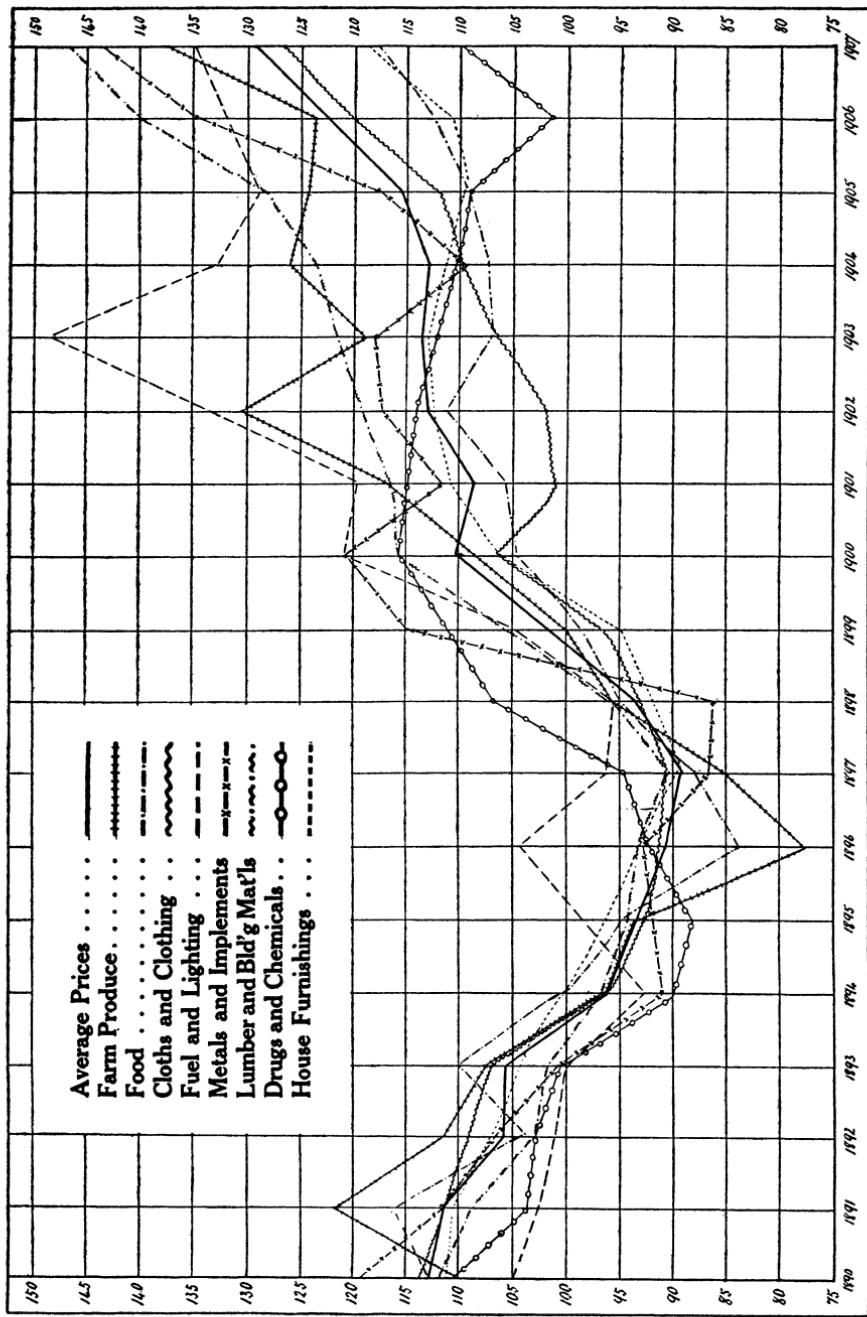
¹ *Report of Director of U. S. Mint*, 1896, p. 46; silver, \$4,236,900,000.

² *Ibid.*, 1907, pp. 96, 97; silver, \$3,260,200,000.

poses, leaving all the demand in the arts to fall upon the stock already existing in 1895. Therefore, looking to the forces affecting gold alone, one is forced to conclude that gold remained about the same, or a little higher, in value in 1906 as compared with 1896. Consequently prices—so far as determined by the gold side of the price-ratio—ought to have remained nearly the same, or to have been even a little lower in 1906 than in 1896. In actual fact, the level of prices in 1906, not only in the United States, but throughout the world, has risen decidedly above the level of 1896. Therefore, making due allowance for the inaccuracy of all available statistics as to the new demand for gold, there can be no question that the causes for the remarkable rise in prices in the last decade cannot be looked for in those influences directly affecting gold. If not, then the search must be directed to the influences acting directly upon the goods themselves.

III

We may next proceed to state the facts as to the rise of prices, and for this purpose a diagram has been prepared showing the change in the index number for 258 commodities in the United States from 1890 to the last report. In studying the movements of prices, however, it is to be observed that the single index number giving the combined average of the change in prices in any one year, will not, in itself, disclose the diversity of changes in groups of goods, or in any prominent individual article. In order to obtain the facts necessary for an investigation into the causes affecting the change in prices of particular commodities, or groups of commodities, there are presented on the diagram the diverse movements of eight groups of commodities which formed the basis for the computation of the general average of prices. It will be at once observed that the separate variations of the groups are so marked as to make clear the absence of any one common cause. Yet, so far as general influences have been at work, the most striking change appears in the fall of prices following the panic of 1893, and the general tendency to a rise of prices after about 1897 and continuing to 1907. The average



for all commodities for the year 1906 was 36.5 per cent. higher than for 1897, the year of lowest prices; and 22.4 per cent. higher than the average for the ten years, 1890-99.

For the same purpose of gaining additional light which recommended the separation of the total average into the averages for each group, it is desirable to separate the average for each group into the lines representing the changes in price of single commodities. Inasmuch as the actual quotations for each single commodity are the elements out of which the final average for all goods is computed, we have in the fluctuations of single goods the only safe basis for examining into the causes operating upon the prices of goods, as distinct from gold. I have had prepared over 100 diagrams³ showing the change in price from 1890 to 1906 of the separate commodities which are of most importance in the market. These are, of course, too numerous to be published here.

IV

The most striking phenomena are the rapid and extreme variations in the changes of prices. As before observed, it is impossible to assign these results to changes in the value of gold. On the other hand, there is a tendency to higher prices after 1897 which might reasonably be regarded as due to a common cause, or to a set of causes working together. To some investigators, it has seemed that the common cause has been the great new production of gold which has lowered the value of the gold standard. This explanation, however, omits consideration of the new demand for gold already mentioned. Moreover, the rise to 122.4 in 1906 is to be compared with 112.9 in 1890; since there was a great decline to 89.7 due to the panic of 1893. From 1890 to 1906 the rise of prices is only 8.4 per cent.

In studying the various causes, independent of gold, which could change the prices of commodities, we may enumerate the following: (1) progress of inventions and increased skill of management; (2) effect of good and bad seasons; (3) collapse

³ I wish to acknowledge the help given me by Mr. Carl Lambach in the preparation of these many diagrams.

or expansion of credit and speculation; (4) increased wages; (5) higher cost of materials; (6) higher customs-duties; (7) monopolies, or combinations.

1. In seeking to find the causes of the change in prices in 1890-1906, we shall have some guidance in the study of the period from 1860-90. In the recent period there was a rise of prices; in the earlier period there was a fall of prices. Obviously, while the same fundamental forces—both on the side of gold and on the side of goods—were at work in both periods, yet there must have been different combinations of these forces in the two periods under consideration. In spite of the great additions to the supply of gold in 1850-90, the effect of a new demand for gold, together with the phenomenal cheapening of the expenses of providing goods by opening up new resources and by the use of improved methods, far outweighed all other influences, and led to a general fall of prices. From 1895 to 1906, the introduction of improved machinery, better methods of manufacture, applications of science to production, while appearing with more or less importance, seem to have been overwhelmed by other potent forces tending to increase the expenses of production. In fact, while trying to ascertain the causes for a given change of prices we are obliged to see that the resultant is a complex of several co-operating and antagonistic forces; and only by analyzing each and weighing the relative importance of each for or against a rise can we reach any sane conclusion. In this case, the cheapening by improved processes of production has not been so strong an influence as the forces (see (4), (5), (6), and (7)) tending to keep prices at a higher level.

2. In the group of food products we find frequent and extreme fluctuations of prices. Since these changes are so evidently due to the abundance or failure of the crops in particular seasons, no one would for a moment think of assigning these changes to a change in the value of gold, which, at the best, can only be gradual and moderate and which is manifest only after a fairly long period of time. No one needs to be told that a failure of the wheat crop in Argentina will quickly affect the markets in Chicago and Liverpool. The changes directly referable to in-

fluences operating on the commodities themselves, such as good or bad seasons, are clearly seen in the following articles: cotton, cattle, flaxseed, hops, wheat, flour, corn, cornmeal, coffee, prunes, beans, apples, onions, rye, buckwheat, hay, potatoes, rice, and tea.

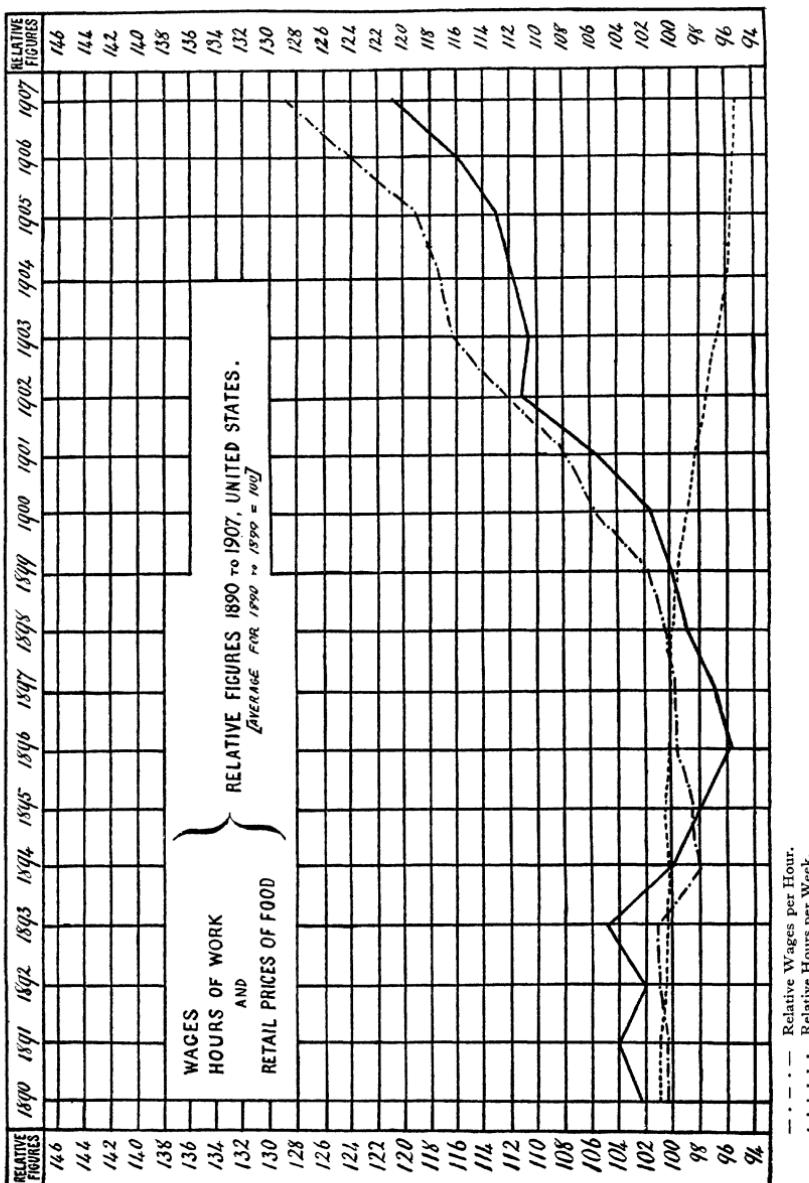
3. The possibility of a great change in prices due merely to the effects of a commercial crisis in 1893, without any reference to the existing stock of gold, is demonstrated beyond question by the extraordinary decline in prices after the Baring failure in 1890 due to conditions in Argentina. And the recovery in prices by 1902 to the former level of 1890 must be ascribed to the return to normal conditions of credit and exchange. In corroboration of this general conclusion—if any were needed—the decline in prices due to the panic of 1907 has been decisive and important. The causes of such a fall in time of liquidation are so well known to economists that there is no reason for mentioning them here.

4. That there has been an increase in money wages, accompanied by more or less decline in the hours of labor per day, there can be no doubt. The extent of this increase, based on the data collected by the United States Bureau of Labor, is graphically presented on the accompanying diagram.⁴ It is not absolutely certain that the rise of money wages is as great as these figures disclose. The possibility of a political purpose in proving that wages have risen more than prices of goods makes one doubtful in giving the results our unquestioned approval.

Nevertheless, whatever the actual increase, it is admitted that there has been a marked advance in wages. If so, one of the main elements entering into the expenses of production of all kinds of goods has risen in cost, and had its effect in raising prices. Such a rise in price is due to more lasting causes than a rise due to speculation. Once that a high rate of wages has been granted, it is not easy for employers to force a reduction. This has been abundantly shown in the after-effects of the recent panic of 1907.

The question is likely to be asked, whether the rise of wages is one of the causes of the rise of prices or whether the rise of prices has made possible the rise of wages. In speculative

⁴ Cf. *Bulletin of the Bureau of Labor*, No. 77, p. 7.



periods, when prices are advancing rapidly, demand for higher wages are easily granted; and higher prices permit higher wages. But in the comparison of the movement of wages with the movement of prices of the goods on which the laborer is engaged, we find in our tables no direct relation whatever between the rise of prices and the rise of wages. For instance, no such connection is shown in the cases of window-glass, silk, hogs, hides, wheat and flour, paper, bricks, and many others. There seems to be an influence independent of prices which has acted to raise the rate of wages. And this influence undoubtedly is due in greater or less part to the pressure of labor-unions, which have been very active in recent years.

Moreover, we must remember that a quotation in a price-table is given for only a single unit of a commodity; and that quotation implies nothing as to the number of units produced by the combined factors of production in any given industry. With improved processes an immensely greater number of units can be produced with the same labor and capital. Hence the total value of the product may vary inversely with the change of price, and so we may find it possible to pay higher wages when prices are falling. Therefore, while there may be some direct relation between the total value of the product and wages, there may be none whatever between the price of a single unit of goods and the rate of wages. Where improved methods are the rule, only the increased value of the product may be regarded as a cause of potentially higher wages; but where little has been done in the way of improved methods, a higher level of wages would be a cause of higher prices.

5. The last ten years have witnessed an increase in the price of articles used in further manufacture; and, whatever the cause of this increase, it is evident that it would produce a distinct addition to the expenses of production of many staples of the market, and lead to a rise in the price of the goods into which they enter as materials. This rise of price of materials is notable in pig-lead, tar, oxide of zinc, sheet zinc, tin plates, bricks, rubber, crude petroleum, wool, lumber, cotton, hides, coal, Bessemer pig, coke, and pig-iron. In each case there is a cause peculiar

to the commodity which will explain its rise of price; under shortage of supply we may cite rubber, or lumber; under monopoly, coal and pig-iron; or under the tariff, tin plates, wool, and hides. In no instance would it be necessary to have recourse to a general world-influence, such as the fall in the value of gold.

6. One of the most striking of the rises in prices of goods is that which appears immediately after the passage of the Dingley protective tariff of July 24, 1897. This is shown in carpets, glass, wool, woolens, blankets, earthenware, furniture, jute, files, wood screws, cut nails, wire nails, augers, chisels, hammers, planes, axes, sheetings, worsted yarns, women's dress goods, barbed wire, molasses, shovels, tickings, etc. Undoubtedly, we have in this high tariff act an influence which produced the effect of a common cause to increase the prices of a large number of articles. If such a cause exists, it removes the necessity of trying to find the explanation of a higher level of prices in the depreciation of gold. Moreover, if there should prove to be another influential cause directly affecting commodities and working together with the tariff to raise prices, there would be the less reason to resort to the gold side of the price-ratio for a common cause of the general upward tendency from 1897 to 1906.

7. This other common cause, the formation of combinations, is unquestionably the strongest force in this period working for higher prices. It is the one which, better than any other, explains the rapid rise in the years from 1897 to 1900—the very years of the greatest activity in the formation of "trusts." And its very close relation to tariff duties makes the beginning of the great rise of prices synchronous with the passage of the Dingley Act in 1897. This fact is to be taken in connection with the establishment of combinations in control of nearly every staple article in the market. This cause is particularly notable in anthracite coal, turpentine, opium, jute, augers, axes, planes, files, hammers, door knobs, mortise locks, chisels, meat, building materials, linseed oil, furniture, tobacco, nails, petroleum, cotton-seed oil, lard, tallow, eggs, codfish, herring, crackers, glucose, barbed wire, copper wire, pepper, molasses, salt, shovels, and pig-iron. Here we find an influence, quite independent of the demand

and supply of gold, which has affected so many articles, in so marked a fashion, as to give the impression of a general cause. Therefore, when we find the appearance of such a cause, it is by no means safe to ascribe it, without careful investigation, to the gold side of the price-ratio.

V

Having, then, presented the facts as to the enormous production of gold since 1895, and the facts as to the rise of prices in the same period, can it be said that the former is the cause of the latter?

Those who adhere to the old quantity theory might reason that the indicated new demand for gold, as shown in the increase of \$2,745,200,000 in the currencies of the gold-using countries, is only a statement of the manner in which the new gold has entered into circulation, and been offered directly (or in forms of credit based on gold reserves) for goods, and thus increased prices in general. There are difficulties, however, in accepting this argument. In the first place, there is no such uniformity in the movement of the prices of all commodities as would require us to put the change in price upon gold itself. In the second place, together with the addition of \$2,745,200,000 of gold to the currencies of the world, we must consider the subtraction of about \$1,000,000,000 of silver from use as money. Evidently, silver was given up when gold could be had in its place—the same process which held up the value of gold in the decades after 1850.

Finally, the tendency to high prices, at least in the United States, is so satisfactorily explained in almost every instance, either by some general influence like the tariffs or the formation of "trusts," or by causes peculiar to the commodity itself, that it is not necessary to resort to a cause originating in gold.

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